



Update to the House Energy Committee

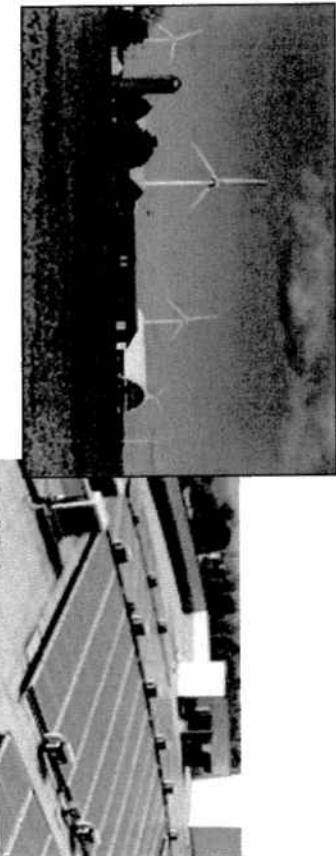
Steve Kurmas
President & COO, Detroit Edison

February 23, 2010

The Michigan Clean Energy Legislation and federal stimulus funds have enabled /accelerated many of our programs



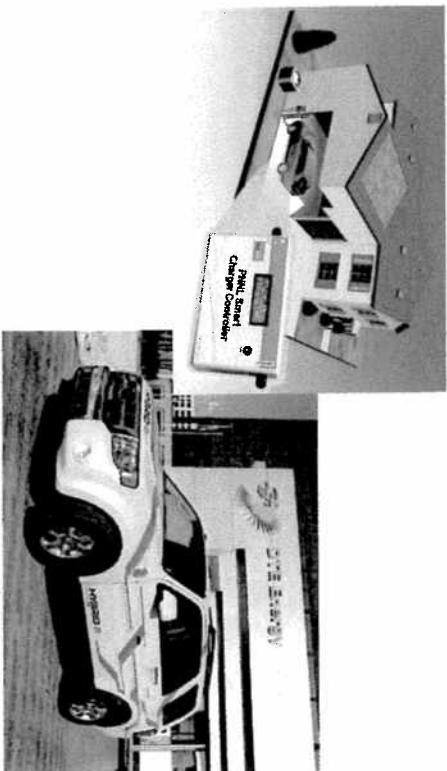
Renewable Portfolio Standard (RPS)



Energy Optimization (EO)



Plug-in Electric Vehicle (PHEV)



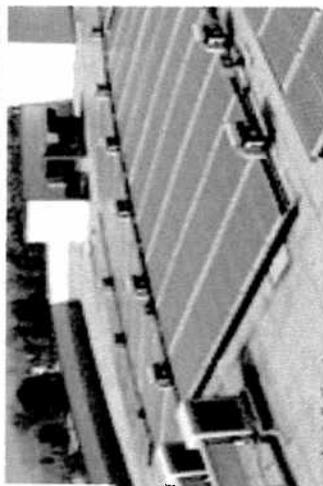
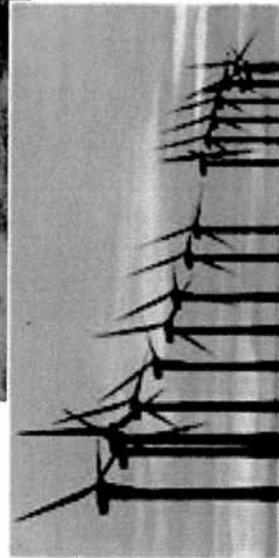
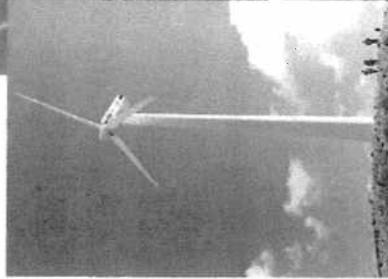
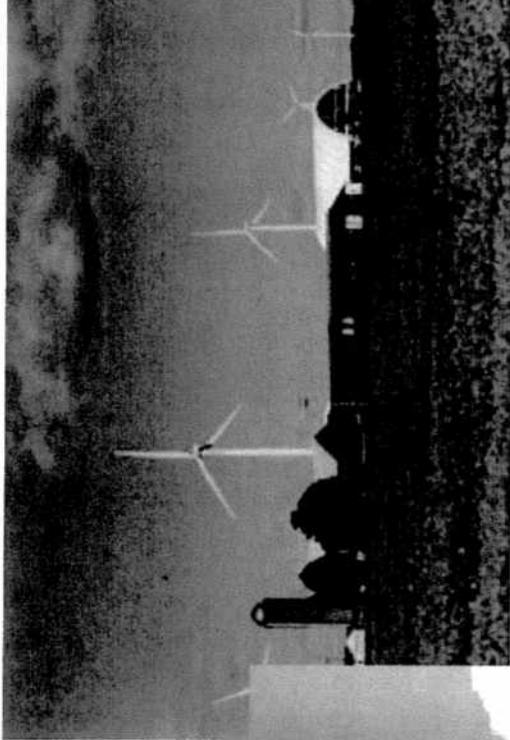
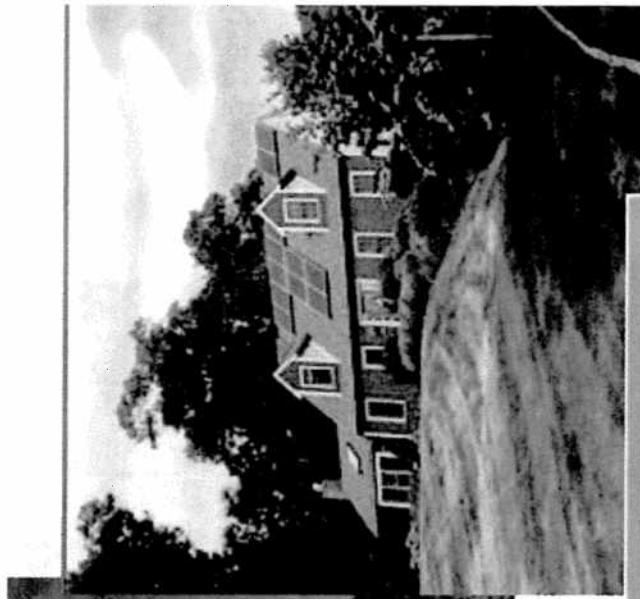
Smart Grid and Advanced Metering Infrastructure (AMI)



DTE Energy®



Renewable Portfolio Standard (RPS)



Michigan RPS Legislation Overview



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Compliance Targets

Funding Mechanisms

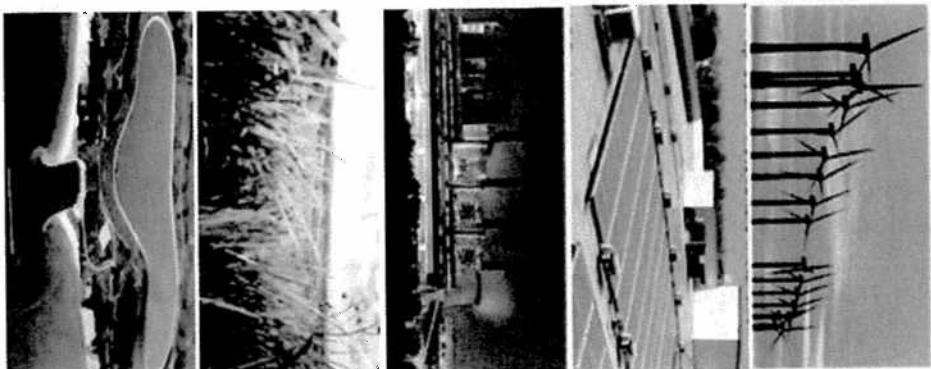
Qualifying Technologies

Ownership Constraints

- 10% of retail sales must come from Michigan-based renewable sources by 2015

- Non-volumetric surcharges
- Renewable energy sold by Detroit Edison at a "transfer price" determined by MPSC

- Up to 50% owned by DTE Energy
- At least 50% by 3rd party



- New capacity requirements
- 300 MWs by 2013;
- 600 MWs by 2015

Multiple, parallel activities are underway to secure the 50% of our RPS portfolio that will be purchased from third parties



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RFP
issued for
RECS

**RFI issued
for joint
development** → **issued
for PPAs
& joint
development**

RFP responses → Contracts signed (est. 1Q 2010)

project operational
12/31/2009. Also
expanded Heritage
contract

Heritage Contract approved by **MPSAC**

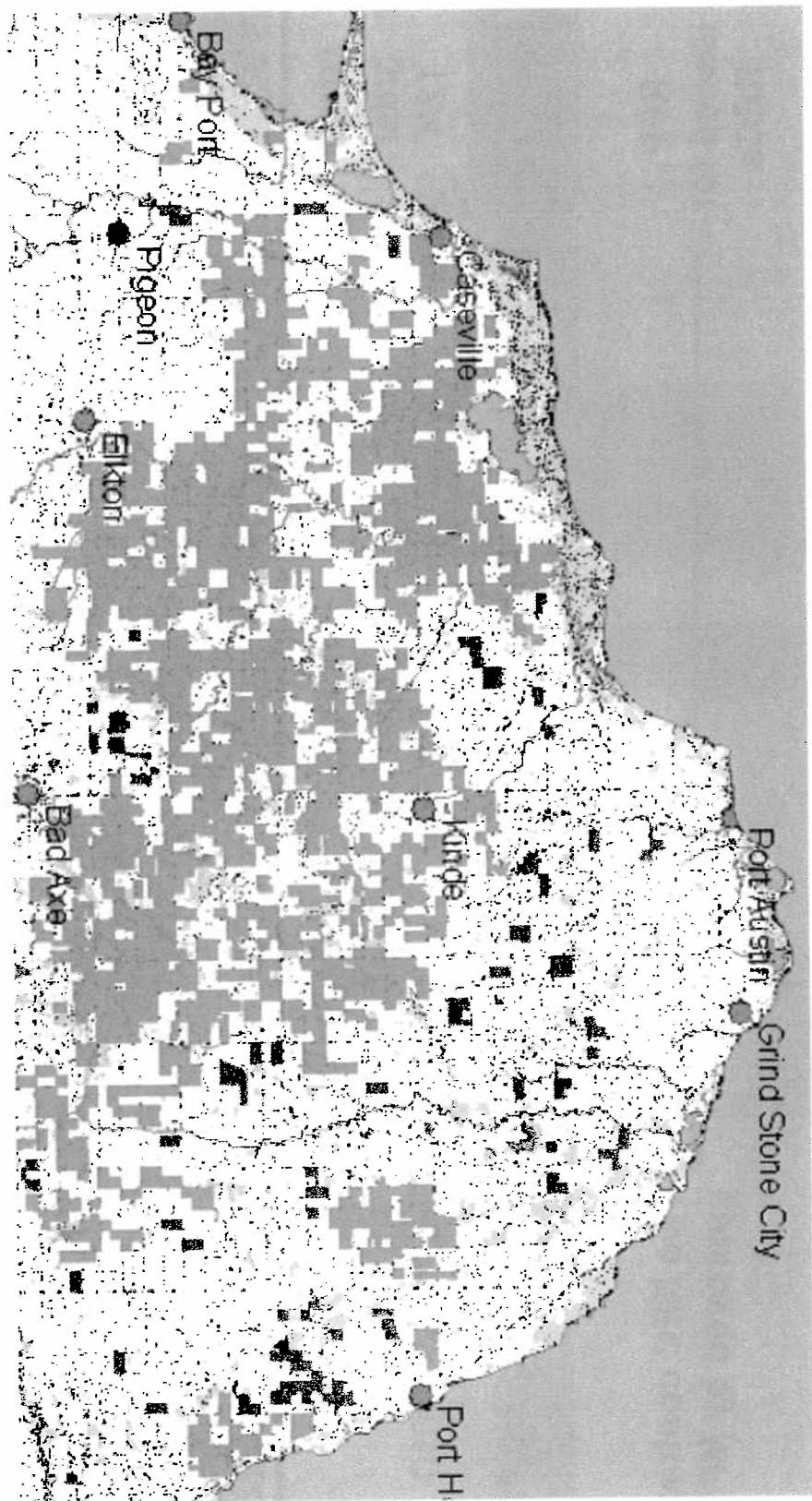
**Unsolicited
bid received
for contract**

Development activities are well underway for future DTE Energy-owned wind farms



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Detroit Edison has easements on ~ 75,000 acres in Huron County plus multiple years of completed wind and wildlife studies. Interconnection access has been requested, but transmission capacity is constrained.



Detroit Edison has also launched the Customer-Owned Solar Pilot Program

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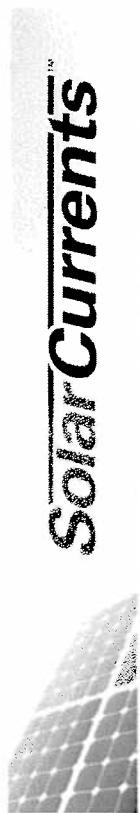
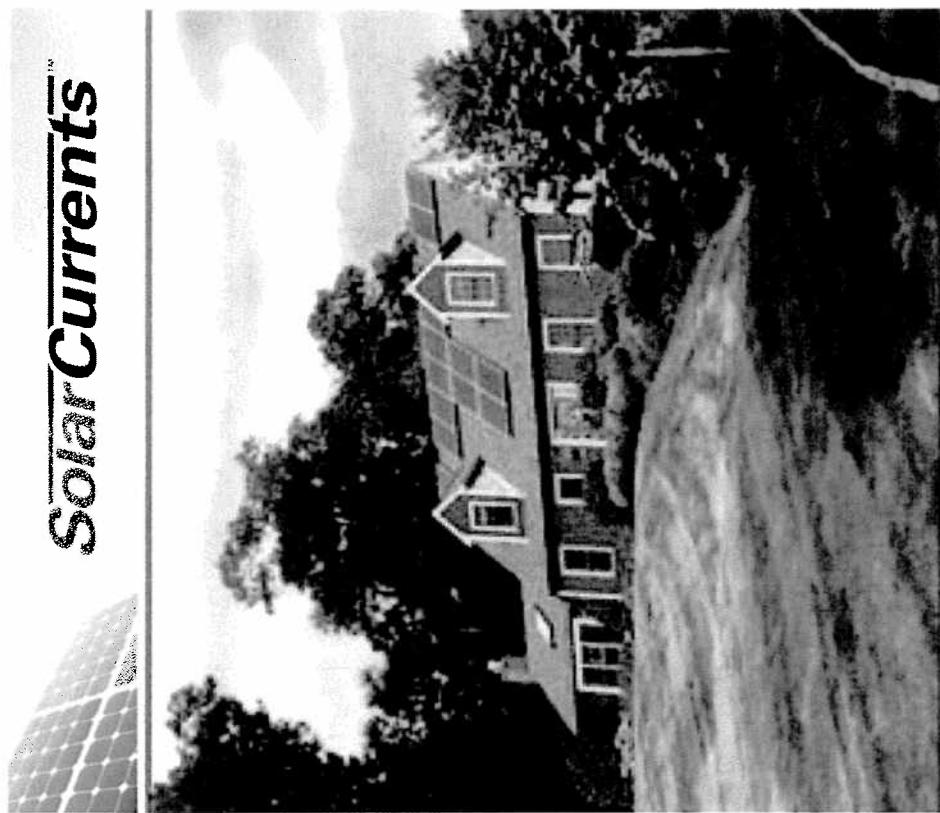
Description

- 5 MW in total nameplate capacity, \$25 Million Program Size (Budget)
- Customers install solar systems up to 20 kW, following Net Metering guidelines
- DECo purchases Renewable Energy Credits (RECs) through a 20-year contract with customers. 2009 and 2010 program provides for:
 - Up-front payment of \$2.40 per watt installed
 - Monthly credit of \$0.11 per solar kWh generated

Progress

- 28 customers (21 residential, 7 commercial) and 123 kW enrolled in SolarCurrents program representing \$321,000 of up-front REC payments made
- 121 applications are pending review, project completion and/or contract finalization
- The 149 applications received represent 852 kW, about 17% of the 5 MW program size.

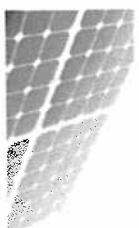
SolarCurrents



At the same time, we have started Detroit Edison-Owned Solar Pilot Program

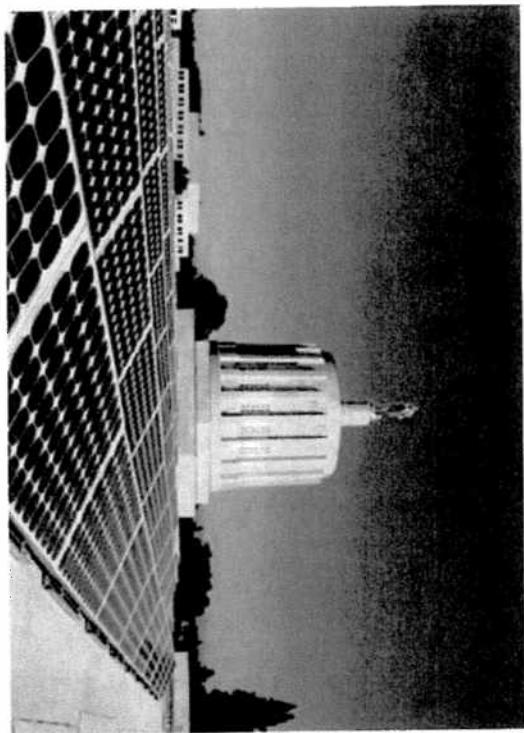
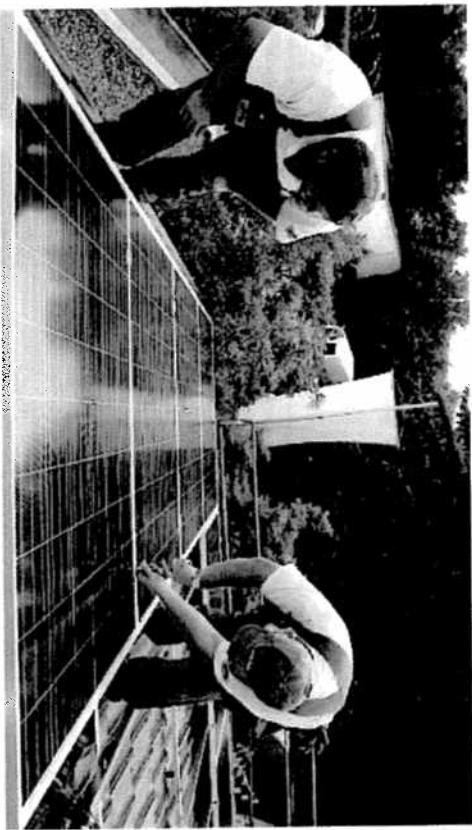


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SolarCurrents™

- 15 MW in total nameplate capacity
- \$112 Million budget over 5 years
- Sited on large rooftops, ground-mounted or on DTE Energy and customer facilities; preliminary sites may include: Ford, GM, A123, U of M, Wayne State University
- Using standard site easement agreements
- Purpose of pilot program is to gain knowledge and experience
 - Multiple technologies
 - Comparison of tracking versus fixed installation schemes
 - Physical and process integration with distribution system operations
- 2010 plan assumes installation of up to 3MW of solar at multiple sites



Detroit Edison's Renewable Energy plan supports job creation in Michigan

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- Design and engineering services
- Direct construction jobs:
 - Job creation will generally occur throughout the 20-year plan period
 - Types of wind construction activities: erecting towers and assembling components, installing and connecting electrical cables and substations, building roads and foundations, equipment logistics and transportation services
 - Types of solar construction activities: equipment installation, system integration, interconnection
- Ongoing operations and maintenance
- Jobs in the community
 - Supporting construction: materials, meals and lodging, transportation, fuel, permitting, communications
 - Resulting from increased tax revenues in the community
- Resulting from increased landowner income through easements and royalties
- Training programs to develop skill sets required by contractors and sub-contractors
- Manufacturing jobs for renewable energy equipment attracted by state-wide renewable investments and smart economic development policies

Energy Optimization (EO)



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We offer a variety of Energy Optimization programs to our customers

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**YOUR
ENERGY
SAVINGS**

YourEnergySavings.com
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Commercial & Industrial Programs

- Prescriptive Incentives
- Custom Energy Efficiency Projects
- New Construction Program

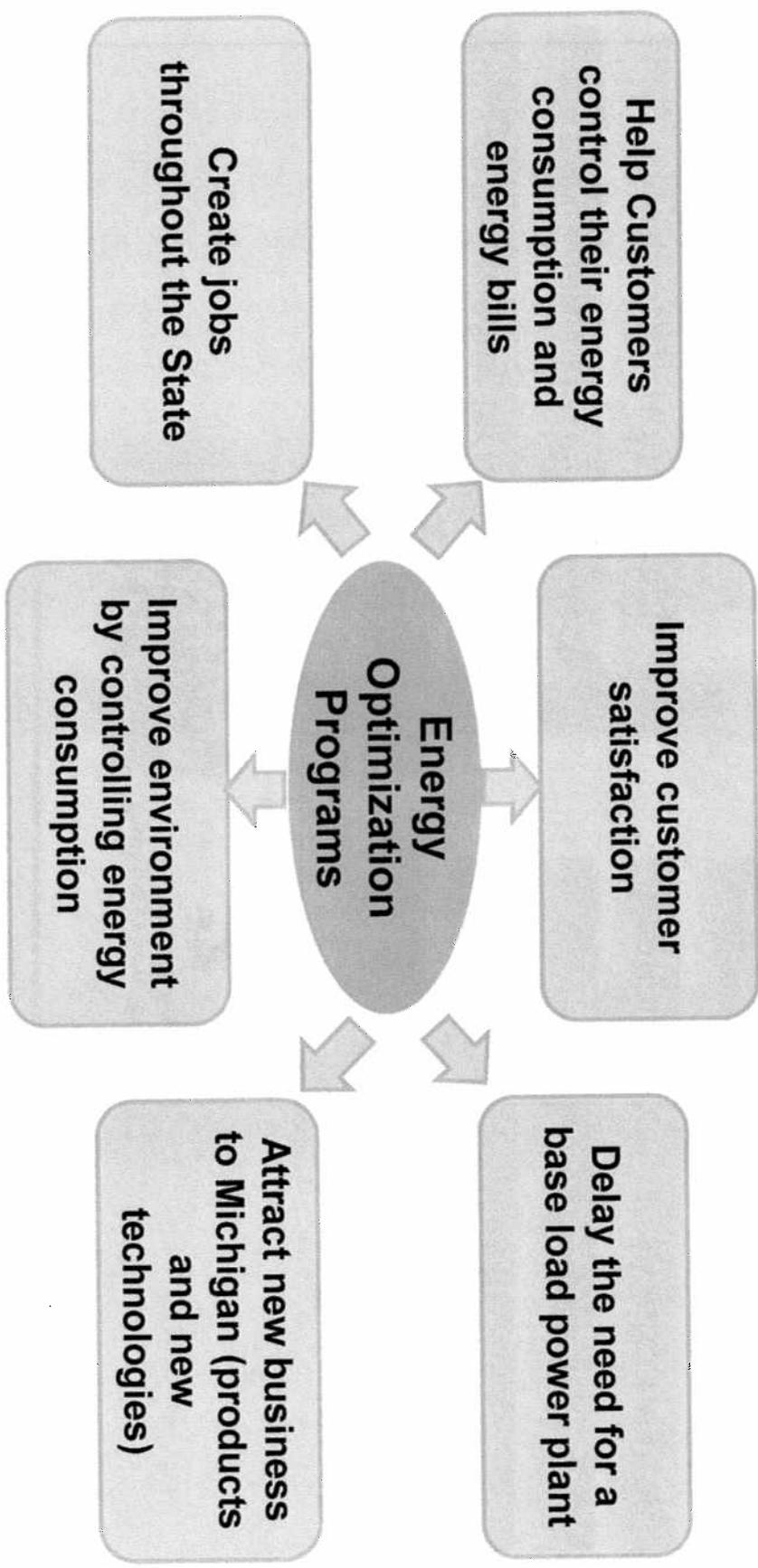
Residential Programs

- ENERGY STAR®
- Appliance Recycling
- Heating, Cooling and Water Heating
- Apartment and Condo Programs
- Energy Audits & Weatherization
- New Construction Programs
- Energy Efficiency Assistance

Energy Optimization programs benefit the residents and businesses in the State of Michigan



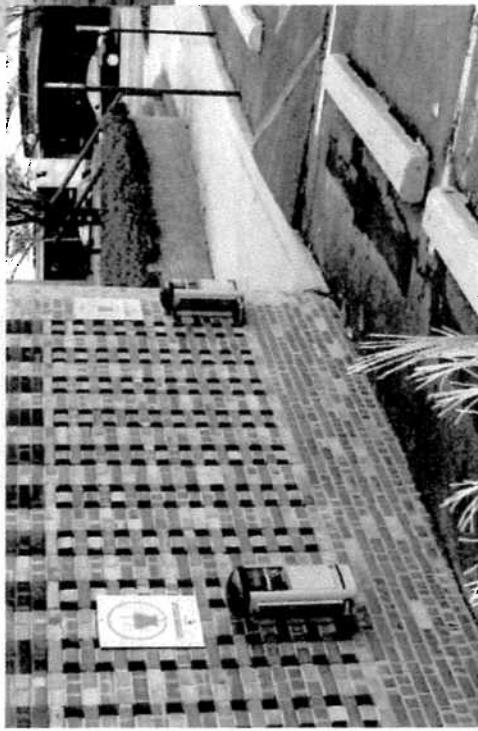
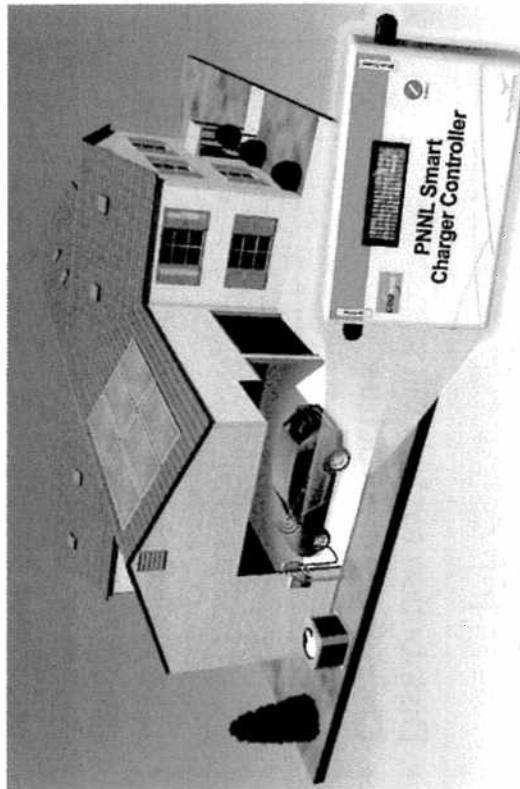
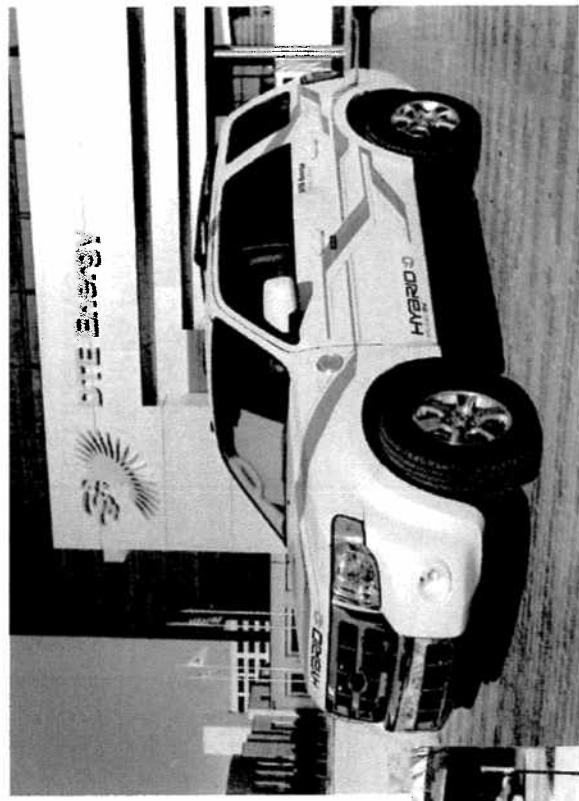
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...in 2009, over 2 million CFLs were purchased by our customers under the Energy Optimizations programs....

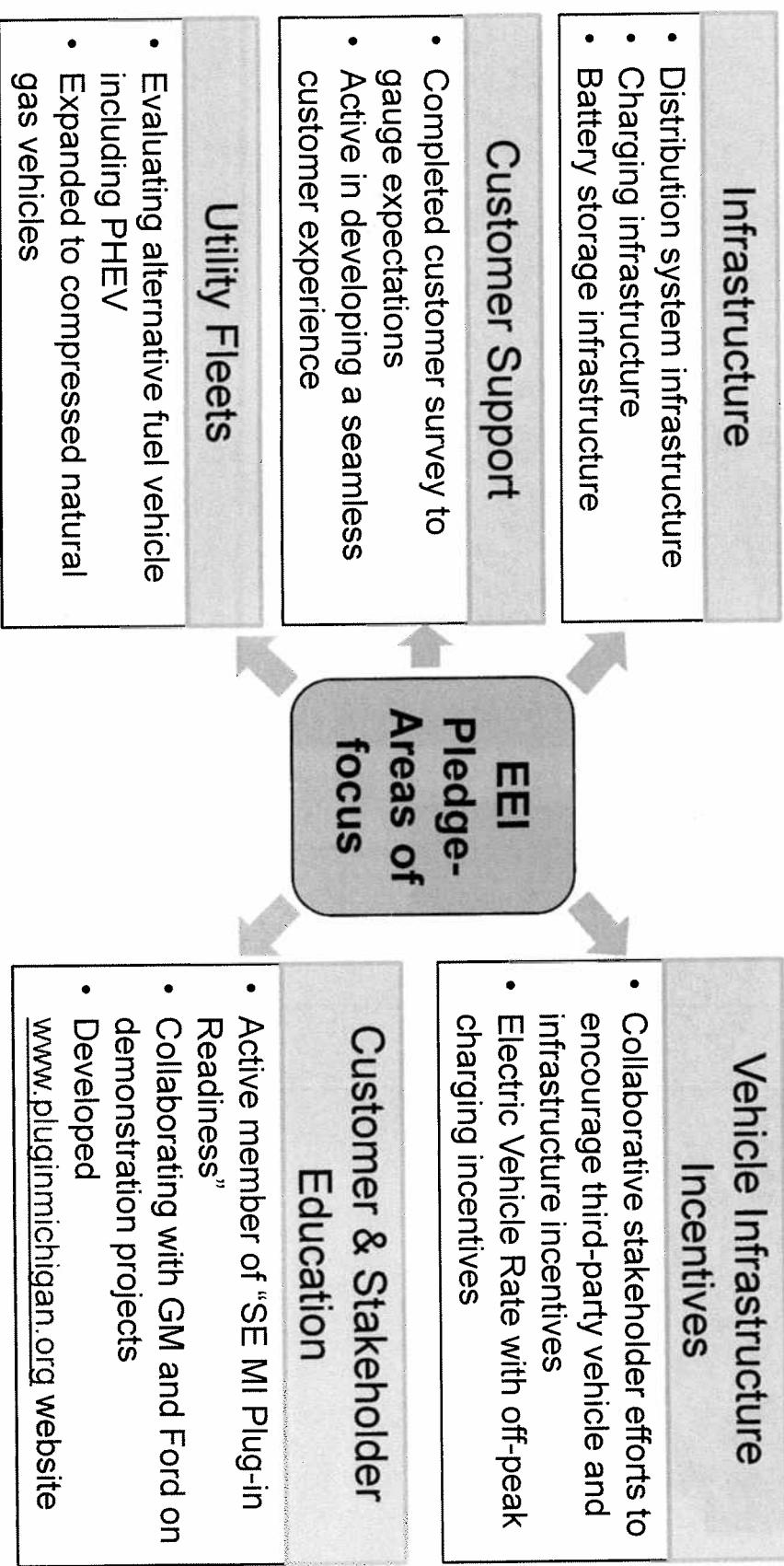
Plug-in Electric Vehicle (PHEV)

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DTE Energy is committed to help make electric transportation a success

To help make electric transportation a success, DTE Energy, along with other Edison Electric Institute (EEI) utilities, signed an industry-wide, plug-in electric vehicle market readiness pledge at the Business of Plugging-In Conference in Detroit in October of 2009



We are actively looking into infrastructure readiness for electric vehicles

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Distribution System Infrastructure

- No need in the near future for increased generation or transmission capacity due to electric vehicles
- Clustering of PEV charging in neighborhoods of early adopters

- Projected need for system upgrades, especially in more established areas close to capacity
- Currently working on a mitigation strategy

Charging Infrastructure

- Demonstrated communication between AMI and two plug-in vehicles using ZigBee communication
 - Saturn Vue
 - Ford Escape

- Engaged in demonstration projects with automakers and vendors to help guide communication standards development and product demonstrations
- Participating in multiple demonstration projects

Battery Storage Infrastructure

- Working on projects to demonstrate battery storage infrastructure
 - A123 System Hybrid Storage/Renewable System Demonstration (MPSC)
 - Advance Community Energy Storage for Grid Support – demonstrate secondary use of automotive batteries as a community energy storage application on Detroit Edison's electric distribution system

We are currently involved in a number of demonstration projects that include the installation of infrastructure



Project Name	Charging Stations*	Location	Time Frame
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DTE Energy PEV Pilot
(MPSC)
8
Detroit, Ann Arbor,
Lansing,
Melvindale

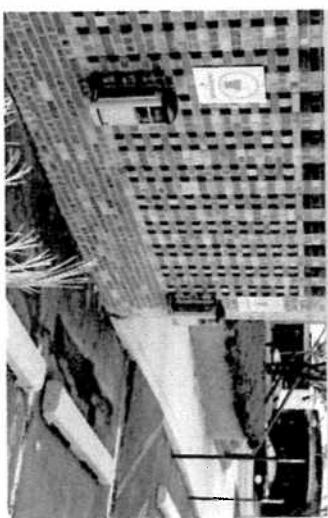
GM Transportation
Electrification
(DOE-FOA-28)
24
Various
locations in
SE Michigan

A123 Systems Hybrid
Storage/Renewable
System Demonstration
(MPSC)
2
Livonia, MI
2010-2011

GM Chevy Volt –
Deployment of test
captured fleet before
commercial rollout in SE MI



DTE Energy's Ann Arbor Facility



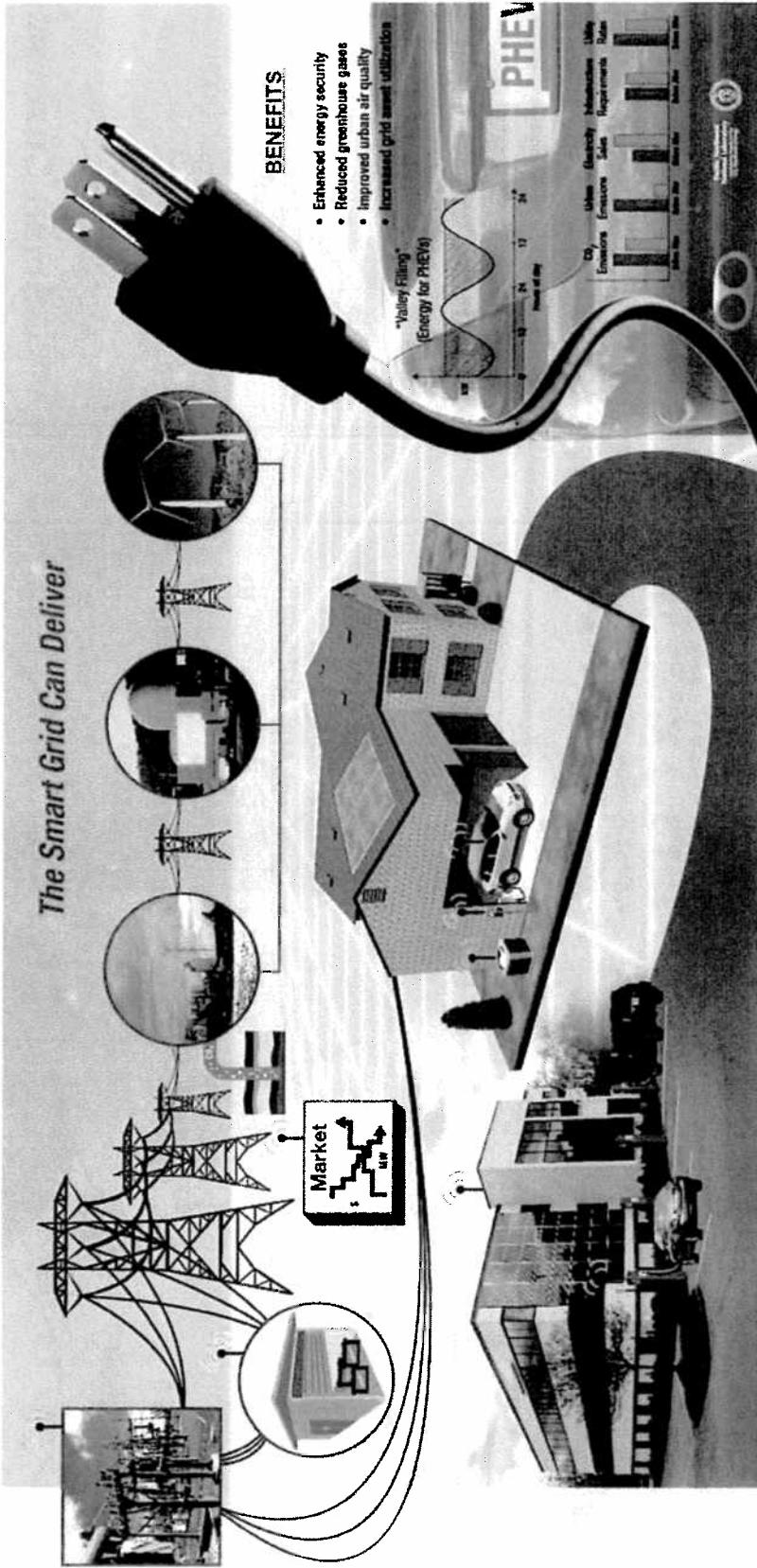
* Installations are a mix of residential, commercial and public charging infrastructure and, use a different number of charging stations manufactures to better understand each application and gain experience with different technologies and service offerings.

Smart Grid and Advanced Metering Infrastructure (AMI)

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Smart Grid, using AMI as its backbone, will transform utility operations and customer experiences, through effective integration of advanced smart circuit and smart home technologies



Smart grid is characterized by AMI as its backbone, along with other supporting elements



Smart Grid Technologies

- Collect data and monitor components
 - Take actions autonomously
 - Provide information to operators
 - Integrate with enterprise processes
- AMI**
- Asset condition monitors
- Sensing and Measurement Devices**
- Advanced Control Methods**
- Two-way Integrated Communication**
- Decision Support**
-
- A central dark grey circle labeled "Advanced Control Methods" is connected by arrows to four surrounding circles: "AMI" (top), "Sensing and Measurement Devices" (left), "Two-way Integrated Communication" (bottom-left), and "Decision Support" (bottom-right). Arrows point from the center towards each of these four circles.

Supporting Elements

Smart Rates

Real time pricing
prepayment options

Smart Customers

Customer incentivized,
enabled and educated to
optimize energy use

Smart Governance

Technical standards, new
rate structures,
consumer protection

- Distributed energy resources (DER)
- PHEV
- Microgrids
- Switches & conductors

A smart grid provides many advantages compared to a conventional grid

	Conventional Grid	Smart Grid
Electromechanical	Digital	
One-way communication (if any)	Two-way communication	
Centralized generation	Distributed generation	
Few Sensors	Monitors and sensors throughout	
“Blind”	Self-monitoring	
Manual restoration	Semi-automated restoration and, eventually, self-healing	
Prone to failures and blackouts	Adaptive protection and islanding mechanism	
Check equipment manually	Monitor equipment remotely	
Emergency decision by committee and phone	Decision support systems, predictive reliability	
Limited control over power flows	Pervasive control system	
Rate	Limited price information	Full price information
Customer	Few customer choices	Many customer choices

Smart grid offers far-reaching benefits to key stakeholders



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- Reduced power quality costs
 - Reduced cost of power interruptions / improvement in system reliability
- Reduced GHG/carbon emissions
 - Reduced CO₂ emissions from vehicles
 - Reduced gasoline and diesel fuel consumption
- Reduced oil consumption

Major Benefits

Reliability and Power Quality

Economic

Environmental

Energy Security

- Lower electricity cost, lower peak demand
 - Lower distribution line losses
 - Customer revenue requirement reduction
 - Lower O&M costs

- Shift of on-peak consumption to off-peak
 - Line losses (power factor improvements)

- Meter Accuracy
 - Customer Complaint
 - Turn-on / Turn-off
 - Meter Reading
 - Outage Restoration
 - Theft Reduction
- Transformer Overload
 - Uncollectible
 - Call Center Calls
 - Call Backs
 - Meter Testing
 - Customer Billing

Detroit Edison's SmartCurrents™ program will entail AMI, Smart Home and Smart Circuit installations in 2010-2011

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AMI

- 660,000+ meters
- Rollout begins in Oakland County and continues in the surrounding areas, including the city of Detroit
- DECo offers OpenWay AMI solutions from Itron

Smart Circuit

- 55 circuit upgrades covering 11 substations at 3 distinct sites
- Sites will overlap with AMI installations in Oakland County

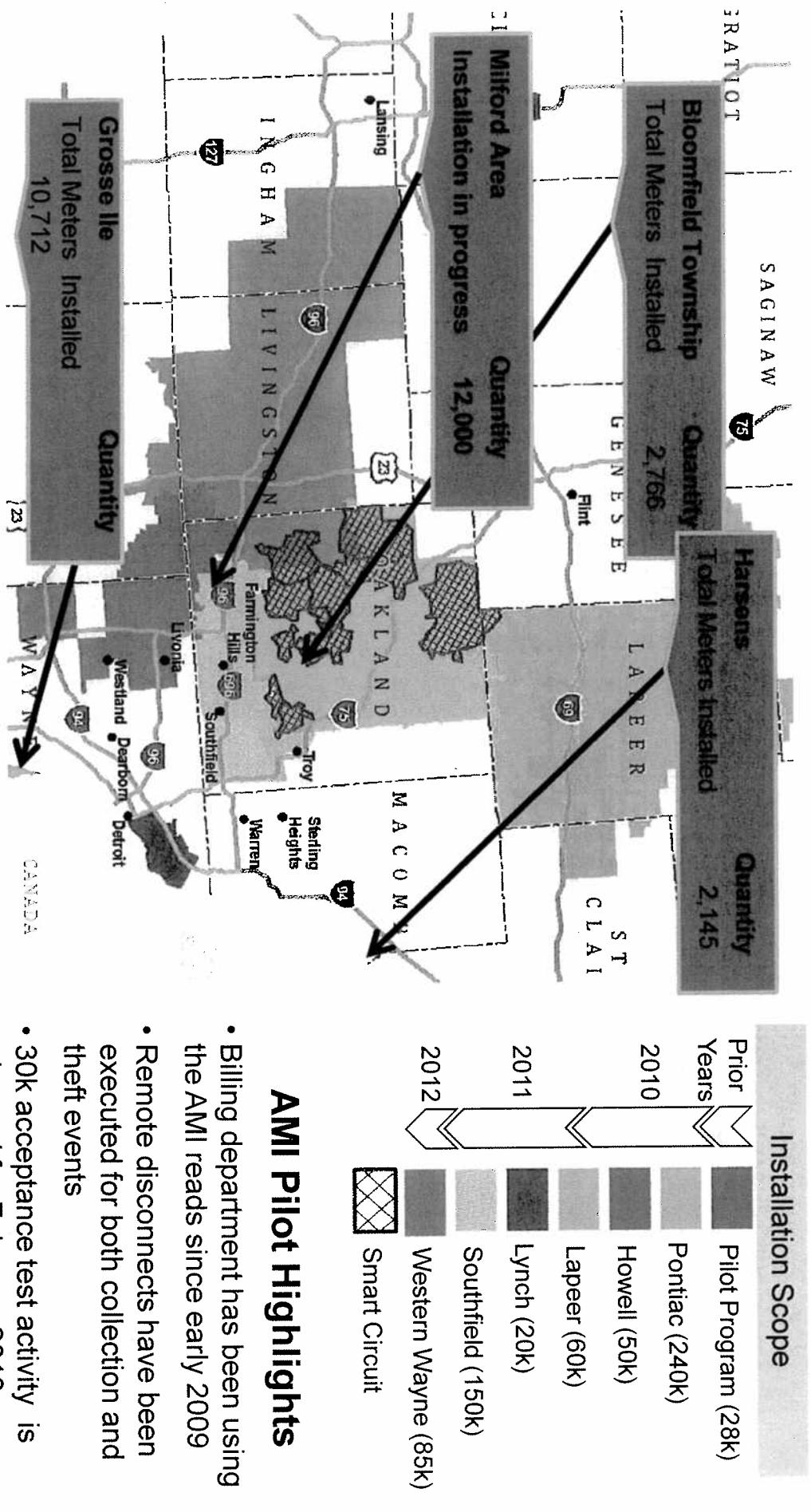
Smart Home

- Smart appliances to 300 customers
- In-home displays (IHD) to 3,600 customers
- Programmable Thermostats (PCT) to 3,400 customers
- Dynamic pricing to 5,000 customers
- DECo offers PCTs and IHDs from Converge and smart appliances from Whirlpool

Information Technology (IT)

- 15 integrated IT systems to provide a complete and connected picture of the distribution network
- Security and Interoperability

AMI and Smart Circuit installation are well planned for the next two years



Smart Circuit upgrade technologies will be deployed

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Key Features

- Intelligent switching and fault diagnosis
- Voltage/VAR control to reduce system losses
- A complete and connected picture of the whole system
- System level diagnosis and modeling applications to ensure reliability and efficiency
- Business intelligence to operators and functional organizations

Remote monitoring and control devices

- Intelligencer from S&C Electric Company
- Cooper "Triple Single" switches
- Automatic pole top switches
- Substation Remote Terminal Units (RTU) and IEDs
- Capacitors retrofitted with remote SCADA control
- New wiring to provide additional switching options

Extended communication networks

- Already existing Field Communication Network (FCN) extended to all key points in distribution system
- All devices support the DNP 3.0 communication protocol

Central Distribution Management System (DMS)

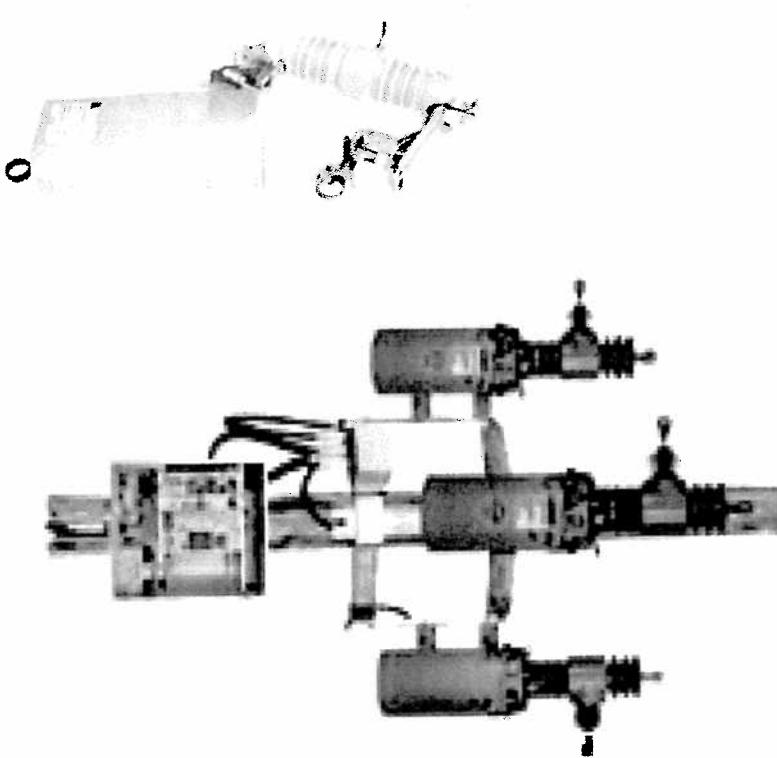
- SCADA (Supervisory Control and Data Acquisition)
- EMS (Energy Management System) from ABB
- Meter Data Management (MDM)
- Geographic Information System (GIS) called ESR!
- Asset Management System (AMS) called Maximo
- Outage Management System (OMS) called In-Service

Devices/ Systems

Smart Grid devices provide the means to prevent sustained outages

Detroit Edison has already implemented some smart grid devices

- Trip-Saver fuse replacements allow temporary faults to clear (pilot underway)
- Triple-Single reclosers interrupt single phase faults
- Intelliteam devices isolate faults and restore unaffected distribution or subtransmission line sections
- Sectionalize circuit with automatic loop schemes restore unaffected sections of circuits



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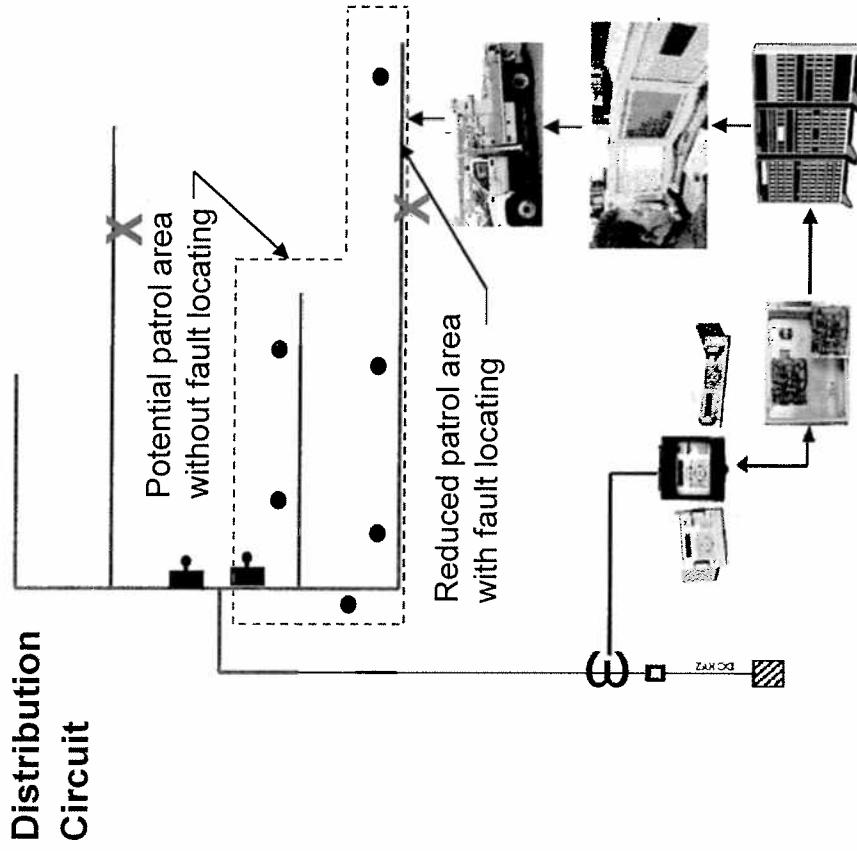
Distribution Management System's (DMS) fault location ability will improve restoration time

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- Significant improvement has been realized in restoration performance since 2003

- Implementation of the new SCADA computer system in SOC is an opportunity to further improve restoration performance
- The fault location tool coordinated with AMI or customer calls will narrow the probable trouble location, minimizing circuit patrol time.



- X DMS calculated fault locations
- AMI or customer outage calls

Smart Circuit installation focused on 3 sites/11 substations/55 circuits, with diversity on electric demand, demography & system reliability



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Site 1

- 7200 customers
- 150 miles of conductor
- Densely populated
- Residential houses and apartments/condos
- Some commercial and shopping centers

Site 2

- 50,000 customers
- 900 miles of conductor
- Medium population density
- Rural and small towns to suburban areas
- Some large commercial and industrial sites

Site 3

- 14,000 customers
- 575 miles of overhead conductor
- Low population density
- Rural areas
- Large geographic area with long circuits

Substation	Site #	Township	Customers	Intelligent Switches	Upgraded switches	RTUs	Relays	FCN	Capacitors w/ comm.
Alpine, Long Lake	1	Bloomfield	7,172	17	13	2	11	Yes	8
Nixon, Lily,		Waterford, West							
Commerce Lake,	2	Bloomfield,							
Milford, Laredo,		Commerce,							
Teggerdine		Milford, White Lake	50,613	42	26	5	12	Yes	32
Wolfhill, White Lake, Clyde	3	Brandon, White Lake, Highland	14,036	18	6	3	6	Yes	10
Totals			71,821	77	45	10	29		50

Smart Home devices enable intelligent functionalities

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Smart Home Components	Component Features
AMI Meter	<ul style="list-style-type: none"> Ability to send energy consumption data and pricing signals to Home Area Network (HAN) Ability to send warnings and alerts to HAN Remotely shut-off & turn-on power flow
In-Home Display (IHD)	<ul style="list-style-type: none"> Display of energy consumption data and pricing information Display of warnings and alerts
Home Energy Management System (EMS)	<ul style="list-style-type: none"> Contains all features of an IHD Enables both in-home and remote programming of components
Internet / HAN Gateway	<ul style="list-style-type: none"> Connects Internet to HAN through broadband connection
Programmable Communicating Thermostat (PCT)	<ul style="list-style-type: none"> Ability to turn-on or turn-off based on pricing signals Can be programmed both in-home and remotely
Smart Appliances	<ul style="list-style-type: none"> Ability to turn-on or turn-off based on pricing signals Can be programmed both in-home and remotely Monitors the frequency of the system
Plug-in Electric Vehicle (PEV) Charging Station	<ul style="list-style-type: none"> Ability to turn-on or turn-off based on pricing signals Can be programmed both in-home and remotely Display energy consumption and supply data Sub-metering may be required
Distributed Energy Resources (DER)	<ul style="list-style-type: none"> Supplies electric power to home Customer can sell un-used power back to grid Sub-metering may be required

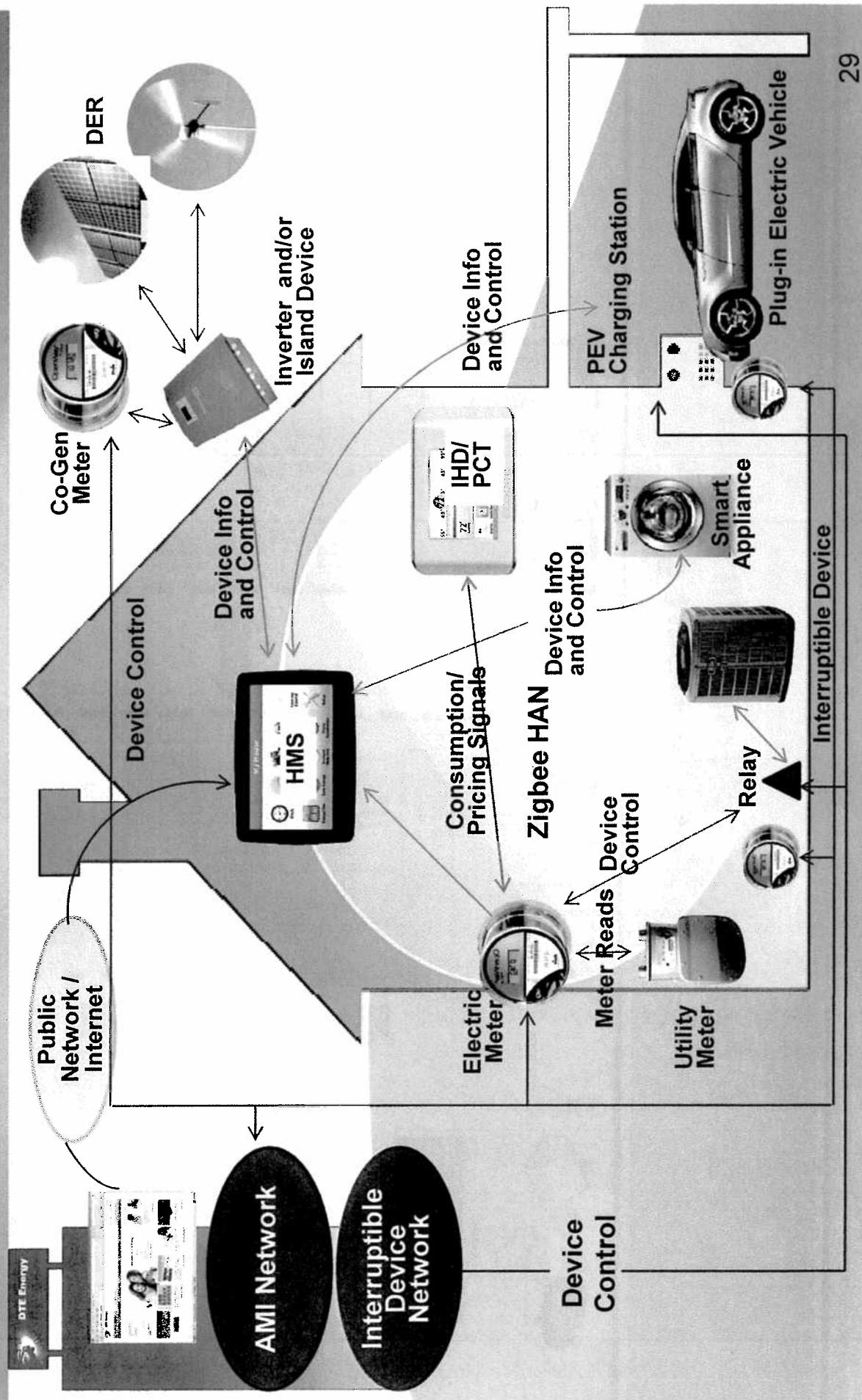
Smart home devices will be deployed in the next two years along with dynamic pricing



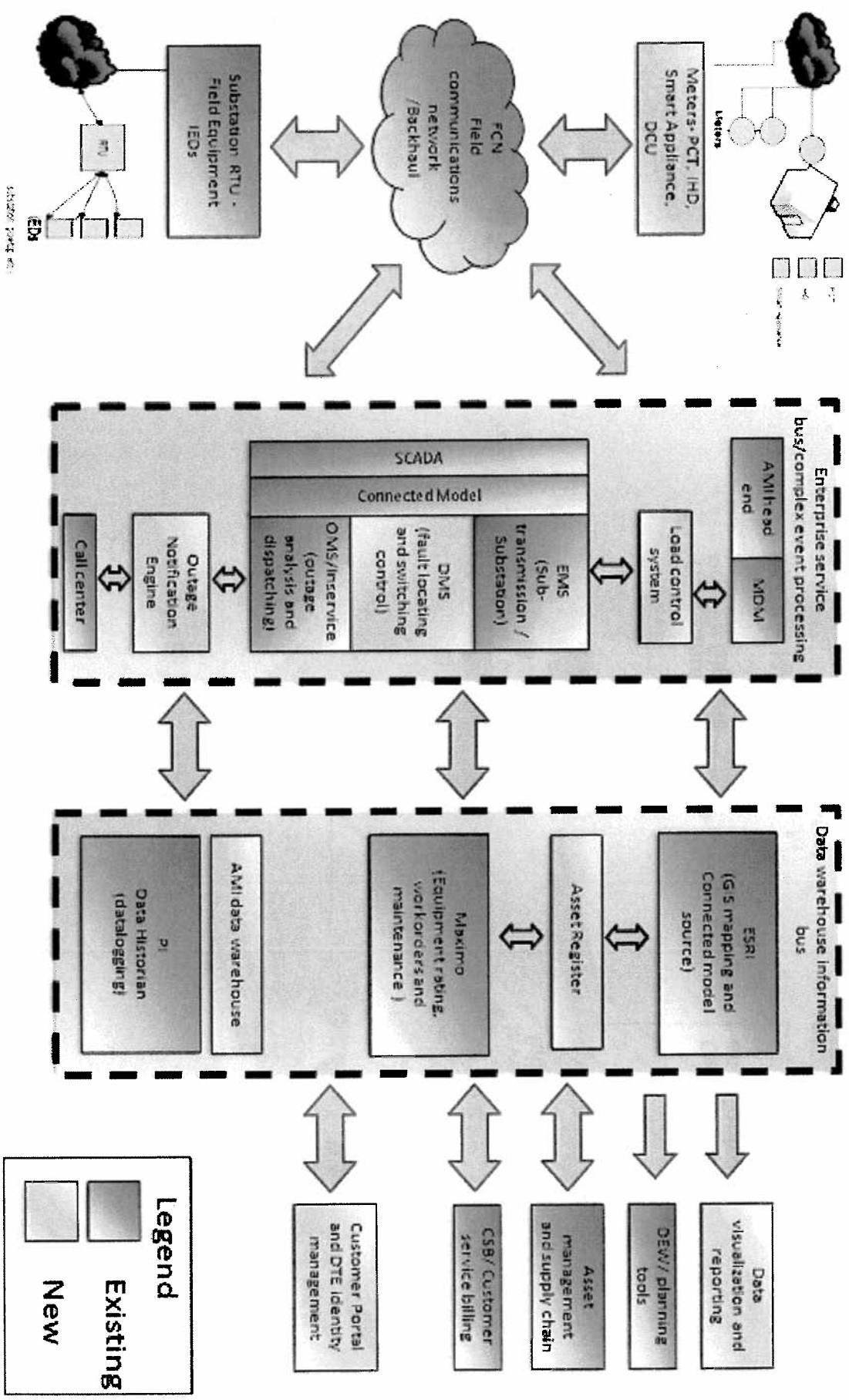
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Customer Groups	Description of Smart Devices	Dynamic Pricing	Smart Appliance	In-home Display	No. of locations
Residential with Education	Education only				5,000
Residential w/PCTs	Dynamic pricing w/PCTs	✓			1,500
Residential w/IHDs	Dynamic pricing w/ IHDs	✓			1,500
Residential w/PCTs & IHDs	Dynamic pricing w/ PCTs and IHDs	✓			1,500
Residential Appliances	Full appliance set; Refrigerator/ Dishwasher; Laundry appliances only	✓	✓	✓	300
C&I Thermostat	C&I dynamic pricing	✓			
Pre-Pay	Res and C&I	✓			
Pre-Pay w/ dynamic pricing	Res and C&I w/ dynamic pricing	✓			100
Base Price		Critical Peak Price			
Dynamic Pricing		<ul style="list-style-type: none"> Off peak Mid peak On peak 			
		<ul style="list-style-type: none"> Callable for approximately 1% of the yearly hours Each event has a maximum duration of 4 hours, with no more than 20 events per year 			

Extensive data flow within the smart Home transforms customer's energy experiences



Integrated information systems will be required to ensure full benefits of the smart grid



Interoperability and security issues around the IT systems will continue to be our challenges

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Interoperability

- The ability of diverse systems and their components to work together
- Standards for communications and information flow between diverse systems is critical for smart grid to function

Security

- A secure grid withstands physical and cyber attacks without suffering massive blackouts or exorbitant recovery costs.
- It is less vulnerable to natural disasters

- NIST has yet to finalize the Smart Grid interoperability framework and standards

- Smart Grid interoperability requires a flexible framework, much like contract law

- Digitization of electric grid adds an inherent vulnerability in terms of cyber security
- Smart Grid will expose the utility's IT systems to external networks - both at customer's site and with other utilities
- Interconnected networks can introduce common vulnerabilities

- Increased number of entry points means more avenues for potential adversaries to exploit the system

- Potential to compromise data confidentiality, including breach of customer privacy

Questions?



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